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ACCIDENTS AT METALLURGICAL WORKS IN THE UNITED STATES

DURING THE CALENDAR YEAR 1920

BY

WILLIAM W. ADAMS

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ACCIDENTS AT METALLURGICAL WORKS IN THE UNITED STATES DURING THE CALENDAR YEAR 1920.

By WILLIAM W. ADAMS.

INTRODUCTION.

Accidents at metallurgical plants (excluding iron blast-furnaces) during the calendar year 1920 resulted in the death of 61 employees and the injury of 8,863, according to reports received by the Bureau of Mines from operators throughout the country. The number of men employed was 56,908; they worked a total of 18,935,908 shifts, an average of 333 shifts per man.

The foregoing figures indicate a reduction of 3 fatalities and an increase of 737 injuries as compared with the year 1919. The accident rates, based on a standard of 300 working days to the year, were 0.97 killed and 140.42 injured per thousand men employed, as against 0.99 killed and 126.26 injured the year before. There was a decrease of 4,212, or 7 per cent, in the number of men employed in 1920 and a reduction of 371,445 days, or 2 per cent, in total shifts worked, but there was a gain of 17 shifts, or 5 per cent, in the average number of working days per man.

The accidents during 1920 are segregated as follows: Twenty-one fatalities and 2,624 injuries at ore-dressing plants; 20 fatalities and 4,147 injuries at smelters; and 20 fatalities and 2,092 injuries at auxiliary works.

Of all of the nonfatal accidents during the year covered by this report, 75.9 per cent resulted in slight injury of 1 to 14 days' duration, 21.6 per cent in temporary disability lasting more than 14 days, and 2.5 per cent in some partial disability of a permanent character. Only two injured employees (less than 0.03 per cent) were reported as totally and permanently incapacitated.

Table 1 presents a summary of the principal data relating to accidents at ore-dressing plants, smelters, and auxiliary works for each year since 1913, the first year for which such statistics were compiled by the Bureau of Mines.

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Tables 6 and 7 summarize by States and causes the accidents in 1920 at all metallurgical plants in the United States (except iron blast furnaces) as shown by reports received by the Bureau of Mines from operating companies.

TABLE 1.—*Summary of labor and accidents at metallurgical plants.*

	Men employed.		Days of labor performed.	Average days active.	Total number killed.	Number killed per 1,000 300-day workers.	Total number injured.	Number injured per 1,000 300-day workers.
	Actual number.	300-day workers.						
Ore-dressing plants:								
1913	14,985	16,154	4,846,338	323	16	0.99	1,977	122.38
1914	15,128	15,225	4,567,529	302	23	1.51	1,434	94.19
1915	18,564	19,107	5,732,184	309	30	1.57	2,095	109.65
1916[a]	22,365	23,470	7,041,083	315	33	1.41	3,184	135.66
1917[a]	24,111	24,372	7,311,499	303	47	1.93	2,952	121.12
1918[a]	21,809	22,517	6,754,962	310	35	1.55	3,142	139.54
1919[a]	17,262	16,862	5,058,545	293	25	1.48	2,057	122.21
1920[a]	15,959	15,977	4,793,151	300	21	1.31	2,624	164.24
Smelting plants:[b]								
1913	20,564	24,309	7,292,766	355	47	1.93	4,247	174.71
1914	27,879	32,336	9,700,769	348	33	1.02	5,673	175.44
1915	31,327	36,262	10,878,486	347	38	1.05	5,718	157.69
1916[a]	43,829	49,363	14,809,046	338	36	.73	9,656	195.61
1917[a]	44,376	50,659	15,197,643	342	53	1.05	7,745	152.88
1918[a]	39,899	45,439	13,631,601	342	42	.92	6,743	148.40
1919[a]	28,777	31,324	9,397,082	327	34	1.09	4,431	141.46
1920[a]	24,944	29,137	8,741,116	350	20	.69	4,147	142.33
Auxiliary works:								
1913, 1914, 1915[c]								
1916	14,007	15,763	4,729,010	338	14	.89	2,240	142.10
1917	15,555	17,014	5,104,146	328	16	.94	2,881	169.33
1918	18,044	20,111	6,033,184	334	17	.85	2,808	139.63
1919	15,081	16,172	4,851,726	322	5	.31	1,638	101.29
1920	16,005	18,005	5,401,641	337	20	1.11	2,092	116.19

[a] Not including auxiliary works, as shops, yards, etc.
[b] Exclusive of iron blast furnaces.
[c] Not separately reported.

ACKNOWLEDGMENTS.

The Bureau of Mines gratefully acknowledges the cooperation of the owners and operators of metallurgical plants and of others interested in the metallurgical industry who have voluntarily furnished the data upon which the tables in this report are based. Such cooperation if continued from year to year should result in the more prompt publication of reports relating to accidents at metallurgical works, as well as in more accurate, complete, and therefore more representative figures.

Data for California and Utah were furnished by the Industrial Accident Commission of those States. For assistance in the compilation of the various tables credit is due to Miss L. S. Gerry, of the Bureau of Mines.

SCOPE OF STATISTICS.

The tables in this publication have been compiled by the Bureau of Mines from reports furnished voluntarily and directly by operators

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of ore-dressing plants and smelters throughout the United States, with the exception of information for the States of California and Utah. The statistics herein presented, although not altogether complete, represent the entire metallurgical industry except iron blast-furnace plants, accident reports for those not being received by the Bureau of Mines. The figures for smelting plants cover copper, lead, gold, and silver smelters and refineries; those for ore-dressing plants represent concentrating plants for copper ores, lead ores, zinc ores, stamp mills, cyanide plants, iron-ore washers, flotation mills, and sampling works.

CLASSIFICATION OF ACCIDENTS.

As a step toward uniformity in the statistical presentation of the hazards of the metallurgical and mining industries, the Bureau of Mines in 1916 classified the nonfatal injuries on a 14-day (2 weeks) basis, thus conforming with the classification adopted in the compensation laws of many States. A summary of accidents at mills, smelters, and auxiliary works on this basis for 1916 to 1920 follows:

Fatal and nonfatal accidents, 1916–1920.

	1916	1917	1918	1919	1920
1. Fatal	83	116	94	64	61
2. Serious (time lost, more than 14 days):					
Permanent disability—					
Total [a]	17	5	7	2	2
Partial [b]	200	202	247	71	147
Others	3,443	3,302	3,028	[c] 1,869	[c] 1,990
3. Slight (time lost, 1 to 14 days, inclusive)	11,420	10,069	9,411	6,184	6,724
Total nonfatal injuries	15,080	13,578	12,693	8,126	8,863
Grand total (fatal and nonfatal)	15,163	13,694	12,787	8,190	8,924
Men employed	80,201	84,042	79,752	61,120	56,908

[a] Permanent total disability: Loss of both legs or arms, one leg and one arm, total loss of eyesight, paralysis, or other condition permanently incapacitating workman from doing any work of a gainful occupation.

[b] Permanent partial disability: Loss of one foot, leg, hand, eye, one or more fingers, one or more toes, any dislocation where ligaments are served, or any other injury known in surgery to be permanent partial disability.

[c] "Other serious accidents" in ore-dressing plants, smelting plants, and auxiliary works include 50 cases of permanent partial disability in 1919 and 72 cases in 1920, which could not be segregated.

ACCIDENTS AT ORE-DRESSING PLANTS.

Reports received from operators of ore-dressing plants show that this branch of the metallurgical industry employed 15,959 men in 1920, who worked 4,793,151 shifts, an average of 300 working-days per man. Of these employees, 21 were killed and 2,624 were injured, a decrease of 4 fatalities and an increase of 567 injuries, as compared with the previous year. The accident rates were 1.31 killed and 164.24 injured per thousand employees (300-day workers). For the previous year the corresponding rates were 1.48 killed and 122.21

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injured. The average working-days per man indicates a gain of 7 over the year before, but there was a reduction of 1,303 in the number of employees and a loss of 265,394 in total shifts worked.

Eight of the 21 fatalities in 1920 were caused by "other machinery," 4 by suffocation in ore bins, and 2 each by crushers, rolls, or stamps, by falls of persons, and by electricity. Only one fatality was caused by haulage equipment.

Falls of persons resulted in a larger number of nonfatal injuries than any of the other causes enumerated. The reports showed 323 injuries due to this cause. "Other machinery" ranked second among the principal causes of injuries, followed by falling objects, hand tools, flying objects, haulage, nails and splinters, and crushers, rolls, or stamps. Less than 100 injuries resulted from each of the remaining causes enumerated.

ACCIDENTS AT SMELTERS.

The smelting industry (not including iron blast furnaces) employed 24,944 men in 1920 and the total working time was 8,741,116 shifts, an average of 350 days per man. Accidents killed 20 employees and injured 4,147 others, a reduction of 14 fatalities and 284 injuries from the previous year's record. The accident rates, based upon 300 shifts to the year, was 0.69 killed and 142.33 injured per thousand men employed. For 1919 the corresponding rates were 1.09 killed and 141.46 injured.

The figures for 1920 as compared with those for the preceding year represent a decrease of 3,833 employees, or 13 per cent, and 655,966 shifts, or 7 per cent.

Five of the fatal accidents were due to "other machinery," 4 to cars and motors, 3 each to falls of persons and flying or falling objects, and 1 each to scalding, electricity, and explosion of hot metal.

Of the 4,147 nonfatal injuries, 897 were caused by burns from matte, slag, or molten metal. Flying or falling objects injured 609 men. Among the other major causes of accidents were hand tools, falls of persons, haulage, and "other machinery."

ACCIDENTS AT AUXILIARY WORKS.

The statistics for auxiliary works cover machine shops, yards, and general construction. These works, auxiliary to the mills and smelters, employed 16,005 men in 1920, or 924 (6 per cent) more than in 1919. A total of 5,401,641 shifts was worked, an average of 337 working-days per man, thus indicating a gain of 549,915 shifts (11 per cent) and 15 days per man (4.7 per cent) as compared with the year before. Twenty employees were killed by accidents and 2,092

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were injured. Based on a standard of 300 working-days to the year the accident rates were 1.11 killed and 116.19 injured per thousand employees, as against 0.31 killed and 101.29 injured in 1919.

Six of the 20 fatalities were caused by railway cars and locomotives, 5 by cars and motors, 3 by falling objects, 2 each by falls of persons and machinery, and 1 by failure of ladder or scaffolding.

The principal cause of nonfatal injuries was falling objects, which resulted in the injury of 374 men. Next in the order of number of resulting injuries were hand tools, falls of persons, machinery, and nails and splinters.

ACCIDENTS AT COPPER MILLS AND SMELTERS.

Mills and smelters treating copper ores represent an important part of the metallurgical industry of the United States and a branch that is readily segregated. Tables 15 and 16 have therefore been compiled from the reports of a selected list of copper companies whose accident records appeared reasonably complete. The tables are based upon reports covering 29 ore-dressing plants in 8 States and 24 smelters in 10 States, employing 5,218 men working 1,787,219 shifts at mills and 8,388 men working 2,644,834 shifts at smelters. It is believed that the figures are fairly representative of the accident hazards at metallurgical plants treating copper ores. Similar figures have been compiled since 1915.

IMPORTANCE OF COMPLETE ACCIDENT RECORDS.

Since the enactment of compensation laws by nearly all of the States, increased importance attaches to the accuracy and completeness of the statistical publications on industrial accidents. The insurance premiums that operators of metallurgical plants, mines, and quarries have to pay are determined largely from a study of statistical reports relating to accidents in these industries. It is highly advisable, therefore, that full and accurate data concerning accidents be reported promptly by operators, not only to aid in the study and prevention of such accidents, but also to assist State compensation commissions and other insurance bodies in establishing premium rates that will be fair and equitable.

As the value and practical usefulness of statistical reports are increased or diminished by the promptness or tardiness with which the figures are published, the bureau hopes that its annual inquiries relating to accidents may be filled out by all operators and returned promptly, in order that the value of the reports of the bureau on this subject may not be diminished by any unnecessary delay in their publication.

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STATISTICAL TABLES.

The following tables show the classification and the number of accidents at metallurgical works in the United States during the calendar year 1920:

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TABLE 2.—*Number of men employed, number of days worked, and number of men killed and injured in metallurgical plants in the United States during the year ended Dec. 31, 1920.*

State.	Ore-dressing plants.					Smelting plants.					Auxiliary works.					Widows.	Orphans.
	Men employed.	Days of labor performed.	Average days active.	Killed.	Injured.	Men employed.	Days of labor performed.	Average days active.	Killed.	Injured.	Men employed.	Days of labor performed.	Average days active.	Killed.	Injured.		
Alabama	194	38,216	197	1	9	.....	.....	.....	.....	.....	30	5,502	183	.....	10	.....	.....
Alaska [a]	459	167,076	364	1	49	.....	.....	.....	.....	.....	50	18,200	364	1	1	.....	.....
Arizona	1,812	624,922	345	1	314	2,593	947,232	365	3	687	1,414	503,550	356	1	200	2	5
Arkansas	143	37,350	261	.....	29	440	147,070	334	1	84	173	45,420	263	.....	46	1	1
California [b]	508	136,219	268	3	114	333	109,314	328	.....	37	383	121,271	317	.....	39	2	7
Colorado	1,027	317,982	310	3	120	1,371	455,156	332	2	165	487	135,524	278	.....	89	3	2
Idaho	512	160,659	314	1	51	(c)	.....	.....	.....	.....	170	58,404	344	.....	13	1	.....
Illinois	121	32,089	265	1	16	2,433	881,769	362	3	433	1,371	490,939	358	.....	228	4	7
Kansas	209	47,438	227	.....	42	852	304,551	357	.....	141	17	3,444	202	.....	.....	.....	.....
Michigan	1,418	428,298	302	1	144	585	176,680	302	.....	107	(c)	.....	.....	.....	.....	.....	.....
Minnesota	556	87,637	158	.....	19	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Missouri	795	252,183	317	2	130	1,053	351,635	334	.....	427	814	269,154	331	.....	356	1	.....
Montana	1,122	372,350	332	1	104	1,214	425,459	350	2	151	2,845	1,008,318	354	6	176	6	14
Nevada	889	298,950	336	2	181	672	234,083	348	.....	132	170	56,860	334	.....	6	1	2
New Jersey	511	153,150	300	.....	26	2,650	957,916	361	.....	377	2,035	670,321	329	.....	157	.....	.....
New Mexico	558	155,812	265	2	79	(c)	.....	.....	.....	.....	369	119,582	324	.....	74	2	3
New York	911	265,708	292	.....	158	(c)	.....	.....	.....	.....	247	69,642	282	.....	48	.....	.....
Oklahoma	166	44,438	268	.....	335	704	193,177	274	.....	265	251	72,277	288	1	127	1	.....
Oregon	48	14,530	303	.....	22	.....	.....	.....	.....	.....	6	2,025	338	.....	.....	.....	.....
Pennsylvania	90	30,195	336	.....	24	2,955	1,068,518	362	.....	374	1,986	722,247	364	4	144	2	2
South Dakota	248	90,033	363	.....	20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tennessee	366	109,362	299	.....	40	(c)	.....	.....	.....	.....	813	290,496	357	4	170	4	19
Texas	(c)	.....	.....	.....	.....	674	245,398	364	.....	39	(c)	.....	.....	.....	.....	.....	.....
Utah [d]	1,064	364,689	343	1	276	1,775	640,957	361	3	163	1,140	360,160	316	.....	28	.....	.....
Vermont	134	39,609	296	.....	15	.....	.....	.....	.....	.....	26	7,564	291	.....	18	.....	.....
Virginia	599	156,637	261	.....	16	(c)	.....	.....	.....	.....	108	29,920	277	.....	7	.....	.....
Washington	177	34,424	194	.....	5	776	283,238	365	.....	77	329	118,262	359	1	25	.....	.....
West Virginia	.....	.....	.....	.....	.....	640	200,570	313	.....	91	301	83,785	278	.....	58	.....	.....
Wisconsin	166	46,160	278	.....	54	151	54,558	361	.....	26	93	31,672	341	1	15	1	.....
Other States	1,156	287,035	248	1	232	3,073	1,063,835	346	6	371	377	107,102	284	1	57	3	5
Total, 1920	**15,959**	**4,793,151**	**300**	**21**	**2,624**	**24,944**	**8,741,116**	**350**	**20**	**4,147**	**16,005**	**5,401,641**	**337**	**20**	**2,092**	**34**	**67**
Total, 1919	17,262	5,058,545	293	25	2,057	28,777	9,397,082	327	34	4,431	15,081	4,851,726	322	5	1,638	25	32

[a] Stamp mills, other than at lode mines, not included.
[b] Figures relating to California, in this and all other tables, were supplied by the Industrial Accident Commission of the State of California, San Francisco, Calif.
[c] Included in "Other States."
[d] Figures relating to Utah, in this and all other tables, were supplied by the Industrial Accident Commission, Salt Lake City, Utah.

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TABLE 3.—***Metallurgical plants:*** *Fatalities, by causes and*

State.	Ore-dressing plants.[a]															
	Haulage system (cars, motors, etc.).	Railway cars and locomotives.	Crushers, rolls, or stamps.	Tables, jigs, etc.	Other machinery.	Falls of persons.	Suffocation in ore bins.	Falling objects (rocks, timbers, etc.).	Cyanide or other poisoning.	Scalding (steam or water).	Electricity.	Hand tools, axes, bars, etc.	Nails, splinters, etc.	Flying pieces of rock from sledging or crushing.	Other causes.	Total.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Alabama	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	1
Alaska	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	1
Arizona	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	1
Arkansas	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
California	....	....	....	....	1	1	....	....	....	....	1	....	....	....	....	3
Colorado	....	....	....	....	2	....	....	....	....	....	....	....	....	....	1	3
Idaho	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	1
Illinois	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	1
Kansas	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Michigan	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	1
Minnesota	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Missouri	....	....	....	....	1	....	1	....	....	....	....	....	....	....	....	2
Montana	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	1
Nevada	....	....	....	....	....	....	1	....	....	....	....	....	....	....	1	2
New Jersey	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
New Mexico	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	2
New York	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Oklahoma	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Oregon	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Pennsylvania	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
South Dakota	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Tennessee	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Texas	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	(d)
Utah	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	1
Vermont	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Virginia	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Washington	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
West Virginia	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Wisconsin	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Other States	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1
Total, 1920	1	....	2	....	8	2	4	....	....	....	2	....	....	....	2	21
Total, 1919	....	2	1	1	6	4	4	1	1	1	2	....	....	....	2	25

[a] Stamp mills, sampling works, slime plants, lixiviation, leaching, cyanide, and flotation mills.
[b] Blast, reverberatory, and roasting furnaces; converters, casting department, and refineries.
[c] Yards, shops, construction, etc.
[d] Included in "Other States."

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States, during the year ended Dec. 31, 1920.

Smelting plants.[b]														Auxiliary works.[c]											
Haulage system (cars, motors, etc.).	Railway cars and locomotives.	Cranes.	Other machinery.	Falls of persons.	Suffocation in ore bins.	Flying or falling objects (rocks, timber, etc.).	Gas (burns or asphyxiation).	Scalding (steam or water).	Electricity.	Hand tools, axes, bars, etc.	Nails, splinters, etc.	Burns from matte, slag, or molten metal (pouring or spilling).	Hot-metal explosion.	Other causes.	Total.	Haulage system (cars, motors, etc.).	Railway cars and locomotives.	Falls of persons.	Falling objects (rocks, timbers, etc.).	Nails, splinters, etc.	Hand tools, axes, bars, etc.	Electricity.	Machinery.	Failure of ladder, scaffold, or other support.	Handling not materials.	Other causes.	Total.
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		31	32	33	34	35	36	37	38	39	40	41	
																	1										1
1				2											3								1				1
			1												1												
				1										1	2												
															(d)												
1			1					1							3												
																											(d)
			1										1		2	4							1			1	6
															(d)												
															(d)												
																			1								1
																	1	2	1								4
															(d)		4										4
1			1						1						3												(d)
															(d)												
																			1								1
1			1			3								1	6	1							1			1	1
4			5	3		3		1	1				1	2	20	5	6	2	3			2	1			1	20
6		6	4	4	1	2	1		2			2	2	4	34		1	1				3					5

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TABLE 4.—***Metallurgical plants:*** *Injuries, by causes and*

State.	Ore-dressing plants.[a]															
	Haulage system (cars, motors, etc.).	Railway cars and locomotives.	Crushers, rolls, or stamps.	Tables, jigs, etc.	Other machinery.	Falls of persons.	Suffocation in ore bins.	Falling objects (rocks, timbers, etc.).	Cyanide or other poisoning.	Scalding (steam or water).	Electricity.	Hand tools, axes, bars, etc.	Nails, splinters, etc.	Flying pieces of rock from sledging or crushing.	Other causes.	Total.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Alabama	....	....	1	....	4	1	....	1	....	....	....	....	....	....	2	9
Alaska	2	....	6	1	2	7	....	6	....	1	....	3	2	....	19	49
Arizona	17	2	9	5	36	39	3	21	....	3	3	22	4	13	137	314
Arkansas	4	....	1	....	4	4	....	3	....	....	1	3	1	....	8	29
California	8	....	1	2	23	14	....	21	4	2	....	13	4	2	20	114
Colorado	6	4	5	....	12	17	....	11	....	1	2	5	4	5	48	120
Idaho	....	....	....	2	8	7	....	3	....	....	....	7	3	5	16	51
Illinois	1	1	....	....	2	2	....	2	....	....	....	2	....	2	4	16
Kansas	1	1	....	1	4	4	....	1	....	1	....	8	1	8	12	42
Michigan	4	....	1	2	11	22	....	17	....	....	2	23	7	....	55	144
Minnesota	1	1	....	1	1	5	....	2	....	....	....	2	1	....	5	19
Missouri	8	....	16	2	18	15	1	12	....	....	1	13	10	2	32	130
Montana	6	3	7	2	11	14	....	14	....	....	3	7	3	....	34	104
Nevada	2	3	8	5	14	23	....	26	4	1	1	26	16	10	42	181
New Jersey	2	1	1	....	1	4	....	....	....	1	....	5	1	1	9	26
New Mexico	6	....	1	2	10	9	....	14	1	2	2	11	7	4	10	79
New York	9	1	6	2	30	10	....	27	....	1	2	13	7	9	41	158
Oklahoma	5	1	14	11	14	28	....	27	1	1	....	27	16	94	96	335
Oregon	....	....	7	....	1	4	....	....	2	....	1	....	1	2	4	22
Pennsylvania	7	....	....	....	2	4	....	2	....	1	....	4	....	....	4	24
South Dakota	1	....	2	....	1	2	....	3	3	....	....	....	1	....	7	20
Tennessee	1	1	1	....	13	4	....	6	1	2	1	3	2	3	2	40
Texas	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	(d)
Utah	12	2	9	3	22	47	....	5	....	4	10	42	13	15	92	276
Vermont	....	....	2	....	1	2	....	1	....	....	....	2	4	....	3	15
Virginia	2	2	....	....	1	2	....	4	....	....	....	2	....	....	3	16
Washington	1	....	....	....	....	....	....	....	....	....	....	....	2	2	....	5
West Virginia	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Wisconsin	2	....	2	....	5	4	....	7	....	....	1	12	3	1	17	54
Other States	19	1	2	1	37	29	....	47	....	1	6	6	7	1	75	232
Total, 1920	**127**	**24**	**102**	**42**	**288**	**323**	**4**	**283**	**16**	**22**	**36**	**261**	**120**	**179**	**797**	**2,624**
Total, 1919	111	48	108	59	284	201	5	200	11	34	23	167	97	140	569	2,057

[a] Stamp mills, sampling works, slime plants, lixiviation, leaching, cyanide, and flotation mills.
[b] Blast, reverberatory, and roasting furnaces; convertors, casting department, and refineries.
[c] Yards, shops, construction, etc.
[d] Included in "Other States."

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States, during the year ended Dec. 31, 1920.

Smelting plants.[b]																Auxiliary works.[c]											
Haulage system (cars, motors, etc.)	Railway cars and locomotives.	Cranes.	Other machinery.	Falls of persons.	Suffocation in ore bins.	Flying or falling objects (rocks, timbers, etc.).	Gas (burns or asphyxiation).	Scalding (steam or water).	Electricity.	Hand tools, axes, bars, etc.	Nails, splinters, etc.	Burns from matte, slag, or molten metal (pouring or spilling).	Hot-metal explosions.	Other causes.	Total.	Haulage system (cars, motors, etc.).	Railway cars and locomotives.	Falls of persons.	Falling objects (rocks, timbers, etc.).	Nails, splinters, etc.	Hand tools, axes, bars, etc.	Electricity.	Machinery.	Failure of ladder, scaffold, or other support.	Handling hot materials.	Other causes.	Total.
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		31	32	33	34	35	36	37	38	39	40	41	
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	2	...	...	...	...	...	...	6	10
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	1
50	4	9	50	68	...	120	1	6	11	77	11	132	12	136	687	1	4	13	45	10	32	5	13	3	9	65	200
...	...	...	...	3	...	...	...	1	...	2	1	53	...	24	84	3	1	4	12	4	11	...	2	...	...	9	46
4	1	1	3	2	...	13	4	...	...	2	...	2	1	4	37	1	...	10	6	1	3	1	4	1	4	8	39
19	5	1	13	17	...	27	1	3	3	18	5	25	3	25	165	4	...	11	17	6	13	...	7	2	4	25	89
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	(d)	1	...	1	...	...	3	1	2	1	...	4	13
25	...	3	11	25	...	50	7	4	...	35	8	113	5	147	433	16	2	15	42	27	22	1	13	8	9	73	228
6	7	...	3	10	...	9	...	3	...	37	4	25	...	37	141	...	...	...	...	...	...	...	...	...	...	...	...
3	2	...	2	16	...	15	...	1	...	8	1	6	...	53	107	...	...	...	...	...	...	...	...	...	...	...	(d)
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
18	...	...	17	16	...	82	8	3	...	15	1	88	7	172	427	1	5	25	49	31	49	1	33	2	6	154	356
27	...	8	1	17	...	36	...	...	1	9	3	17	6	26	151	6	2	26	31	6	5	2	23	...	3	72	176
2	12	1	14	12	...	26	1	1	...	17	7	22	...	17	132	...	3	...	1	...	...	...	...	1	...	1	6
32	12	8	3	28	...	70	...	7	...	17	27	81	4	88	377	18	7	17	54	6	21	1	6	6	10	11	157
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	(d)	1	5	8	19	5	9	1	6	...	2	18	74
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	(d)	1	1	4	8	3	5	8	2	...	1	15	48
8	1	...	29	9	...	23	1	2	2	18	...	103	12	57	265	14	...	6	17	8	16	2	10	1	6	47	127
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3	2	1	3	9	...	29	12	3	...	78	2	76	...	156	374	2	1	11	16	5	43	1	6	...	3	56	144
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	(d)	1	4	21	39	9	25	2	8	4	1	56	170
5	3	...	...	6	...	3	...	1	...	7	...	5	2	7	39	...	...	...	...	...	...	...	...	...	...	...	(d)
11	1	6	10	26	...	13	...	4	...	22	5	27	4	34	163	6	3	1	1	...	3	2	1	1	...	10	28
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	...	...	...	...	...	...	15	18
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	(d)	...	2	1	...	1	...	...	...	...	...	3	7
4	1	1	4	6	...	19	...	1	2	4	2	3	1	29	77	1	2	5	6	...	1	...	...	...	2	8	25
2	4	...	4	1	...	8	...	...	...	5	2	51	...	14	91	5	...	3	2	...	6	...	12	...	...	30	58
...	1	1	2	2	...	6	...	...	...	2	1	2	...	9	26	...	...	...	4	...	2	...	...	...	...	9	15
19	16	11	16	22	4	60	5	7	4	41	7	66	5	88	371	1	3	7	3	10	6	...	4	1	2	20	57
238	72	51	185	295	4	609	40	47	23	414	87	897	62	1,123	4,147	83	45	194	374	132	275	28	152	32	62	715	2,092
350	46	60	217	330	2	734	60	39	31	337	70	959	95	1,101	4,431	81	39	158	292	74	196	16	139	18	61	564	1,638

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TABLE 5.—***Metallurgical plants:*** *Percentage of fatalities and injuries, by causes, during the year ended Dec. 31, 1920.*

Cause of accident.	Killed.			Injured.		
	Number killed.	Per cent of group total.	Per cent of grand total.	Number injured.	Per cent of group total.	Per cent of grand total.
Ore-dressing plants:						
1. Haulage system (cars, motors, etc.)	1	4.76	1.64	127	4.84	1.43
2. Railway cars and locomotives	.....	.....	.....	24	.91	.27
3. Crushers, rolls, or stamps	2	9.52	3.28	102	3.89	1.15
4. Tables, jigs, etc	.....	.....	.....	42	1.60	.47
5. Other machinery	8	38.10	13.11	288	10.98	3.25
6. Falls of persons	2	9.52	3.28	323	12.31	3.65
7. Suffocation in ore bins	4	19.05	6.55	4	.15	.05
8. Falling objects (rocks, timbers, etc.)	.....	.....	.....	283	10.79	3.19
9. Cyanides or other poisoning	.....	.....	.....	16	.61	.18
10. Scalding (steam or water)	.....	.....	.....	22	.84	.25
11. Electricity	2	9.52	3.28	36	1.37	.41
12. Hand tools, axes, bars, etc	.....	.....	.....	261	9.95	2.95
13. Nails, splinters, etc	.....	.....	.....	120	4.57	1.35
14. Flying pieces of rock from sledging or crushing	.....	.....	.....	179	6.82	2.02
15. Other causes	2	9.52	3.28	797	30.37	8.99
Total	**21**	**100.00**	**34.42**	**2,624**	**100.00**	**29.61**
Smelting plants:						
16. Haulage system (cars, motors, etc.)	4	20.00	6.55	238	5.74	2.69
17. Railway cars and locomotives	.....	.....	.....	72	1.74	.81
18. Cranes	.....	.....	.....	51	1.23	.58
19. Other machinery	5	25.00	8.20	185	4.46	2.09
20. Falls of persons	3	15.00	4.92	295	7.11	3.33
21. Suffocation in ore bins	.....	.....	.....	4	.10	.04
22. Flying or falling objects (rocks, timbers, etc.)	3	15.00	4.92	609	14.69	6.87
23. Gas (burns or asphyxiation)	.....	.....	.....	40	.96	.45
24. Scalding (steam or water)	1	5.00	1.64	47	1.13	.53
25. Electricity	1	5.00	1.64	23	.55	.26
26. Hand tools, axes, bars, etc	.....	.....	.....	414	9.98	4.67
27. Nails, splinters, etc	.....	.....	.....	87	2.10	.98
28. Burns from matte, slag, or molten metal (pouring or spilling)	.....	.....	.....	897	21.63	10.12
29. Hot-metal explosions	1	5.00	1.64	62	1.50	.70
30. Other causes	2	10.00	3.28	1,123	27.08	12.67
Total	**20**	**100.00**	**32.79**	**4,147**	**100.00**	**46.79**
Auxiliary works:						
31. Haulage system (cars, motors, etc.)	5	25.00	8.20	83	3.97	.94
32. Railway cars and locomotives	6	30.00	9.83	45	2.15	.51
33. Falls of persons	2	10.00	3.28	194	9.27	2.19
34. Falling objects (rocks, timbers, etc.)	3	15.00	4.92	374	17.88	4.22
35. Nails, splinters, etc	.....	.....	.....	132	6.31	1.49
36. Hand tools, axes, bars, etc	.....	.....	.....	275	13.15	3.10
37. Electricity	.....	.....	.....	28	1.34	.31
38. Machinery	2	10.00	3.28	152	7.26	1.71
39. Failure of ladders, scaffold, or other support	1	5.00	1.64	32	1.53	.36
40. Handling hot materials	.....	.....	.....	62	2.96	.70
41. Other causes	1	5.00	1.64	715	34.18	8.07
Total	**20**	**100.00**	**32.79**	**2,092**	**100.00**	**23.60**
Grand total	**61**	.....	**100.00**	**8,863**	.....	**100.00**

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TABLE 6.—***Metallurgical plants:*** *Accidents during the year ended Dec. 31, 1920.*

States.	Ore-dressing plants.[a]					Smelting plants.[b]					Auxiliary works.				
	Killed.	Seriously injured. (Time lost, more than 14 days.)			Slightly injured. (Time lost, 1 to 14 days.)	Killed.	Seriously injured. (Time lost, more than 14 days.)			Slightly injured. (Time lost, 1 to 14 days.)	Killed.	Seriously injured. (Time lost, more than 14 days.)			Slightly injured. (Time lost, 1 to 14 days.)
		Permanent total disability.[c]	Permanent partial disability.[d]	Others.			Permanent total disability.[c]	Permanent partial disability.[d]	Others.			Permanent total disability.[c]	Permanent partial disability.[d]	Others.	
Alabama	1		1		8										10
Alaska	1			15	34						1			1	
Arizona	1		3	70	241	3		15	200	472	1		5	60	135
Arkansas				4	25	1		4	18	62				2	44
California	3			62	52				15	22				20	19
Colorado	3		3	30	87	2			42	123			1	14	74
Idaho	1		2	19	30									7	6
Illinois	1		6	1	9	3		34	82	317			16	36	176
Kansas					42				61	80					
Michigan	1		1	33	110				40	67					
Minnesota			3	6	10										
Missouri	2		4	27	99			2	58	367			3	32	321
Montana	1			37	67	2			54	97	6			71	105
Nevada	2		1	27	153				15	117				2	4
New Jersey				7	19				92	285				43	114
New Mexico	2			13	66								1	7	66
New York			1	14	143								1	3	44
Oklahoma			5	46	284			2	71	192	1			21	106
Oregon				2	20										
Pennsylvania				8	16				63	311	4			31	113
South Dakota				3	17										
Tennessee				8	32						4		2	30	138
Texas									9	30					
Utah	1		3	55	218	3		4	65	94				13	15
Vermont			1	3	11									1	17
Virginia				4	12									3	4
Washington			4	1				5	33	39	1	1	1	14	9
West Virginia								1	9	81				7	51
Wisconsin				10	44				5	21	1			1	14
Other States	1	1	3	37	191	6		7	87	277	1		2	10	45
Total	21	1	41	[e]542	2,040	20		74	[e]1,019	3,054	20	1	32	[e]429	1,630

[a] Ore-dressing plants include stamp mills, sampling works, slime plants, lixiviation, leaching, cyanide, and flotation mills.
[b] Smelters include blast, reverberatory, and roasting furnaces; converters; casting department, and refineries.
[c] Permanent total disability: Loss of both legs or arms, one leg and one arm, total loss of eyesight, paralysis, or other condition permanently incapacitating workman from doing any work of a gainful occupation.
[d] Permanent partial disability: Loss of one foot, hand, leg, eye, one or more fingers, one or more toes, any dislocation where ligaments are severed, or any other injury known in surgery to be permanent partial disability.
[e] "Other serious accidents" in ore-dressing plants, smelting plants, and auxiliary works include 72 cases of permanent partial disability, 1 case of permanent total disability which could not be segregated.

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TABLE 7.—***Metallurgical plants:*** *Accidents during the year ended Dec. 31, 1920.*

	Killed.	Seriously injured. (Time lost, more than 14 days.)			Slightly injured. (Time lost, 1 to 14 days.)
		Permanent total disability.[a]	Permanent partial disability.[b]	Others.	
ORE-DRESSING AND MILLING ACCIDENTS.[c]					
Number killed or injured by—					
1. Haulage (cars and motors)	1	.....	.....	42	85
2. Railway cars or locomotives	.....	.....	1	7	16
3. Crushers, rolls, or stamps	2	.....	5	31	66
4. Tables, jigs, etc	.....	.....	2	8	32
5. Other machinery	8	.....	6	70	212
6. Falls of persons	2	.....	2	92	229
7. Suffocation in ore bins	4	.....	.....	.....	4
8. Falling objects (rocks, timbers, etc.)	.....	.....	4	57	222
9. Cyanide or other poisoning	.....	.....	.....	8	8
10. Scalding (steam or water)	.....	.....	.....	9	13
11. Electricity	2	.....	1	11	24
12. Hand tools, axes, bars, etc	.....	.....	4	31	226
13. Nails, splinters, etc	.....	.....	3	6	111
14. Flying pieces of rock from sledging or crushing	.....	.....	7	12	160
15. Other causes	2	1	6	158	632
Total	**21**	**1**	**41**	*d* **542**	**2,040**
SMELTER ACCIDENTS.[e]					
Number killed or injured by—					
16. Haulage (cars, motors, etc.)	4	.....	2	88	148
17. Railway cars or locomotives	.....	.....	.....	23	49
18. Cranes	.....	.....	2	20	29
19. Other machinery	5	.....	12	48	125
20. Falls of persons	3	.....	8	85	202
21. Suffocation in ore bins	.....	.....	.....	.....	4
22. Flying or falling objects (rocks, timbers, etc.)	3	.....	8	125	476
23. Gas (burns or asphyxiation)	.....	.....	.....	9	31
24. Scalding (steam or water)	1	.....	.....	18	29
25. Electricity	1	.....	1	4	18
26. Hand tools, axes, bars, etc	.....	.....	5	97	312
27. Nails, splinters, etc	.....	.....	1	8	78
28. Burns from matte, slag, or molten metal (pouring or spilling)	.....	.....	24	228	645
29. Hot-metal explosions	1	.....	2	18	42
30. Other causes	2	.....	9	248	866
Total	**20**	.....	**74**	*d* **1,019**	**3,054**
AUXILIARY WORKS' ACCIDENTS. (Yards, shops, construction, etc.)					
Number killed or injured by—					
31. Haulage (cars and motors)	5	.....	3	26	54
32. Railway cars and locomotives	6	1	1	12	31
33. Falls of persons	2	.....	1	64	129
34. Falling objects (rocks, timbers, etc.)	3	.....	5	79	290
35. Nails and splinters	.....	.....	.....	13	119
36. Hand tools, axes, bars, etc	.....	.....	4	45	226
37. Electricity	.....	.....	1	6	21
38. Machinery	2	.....	5	43	104
39. Failure of ladder, scaffold, or other support	1	.....	.....	6	26
40. Handling hot materials	.....	.....	3	13	46
41. Other causes	1	.....	9	122	584
Total	**20**	**1**	**32**	*d* **429**	**1,630**
Grand total	**61**	**2**	**147**	*d* **1,990**	**6,724**
Number of wives left widows, 34.					
Number of children under 16 years of age left fatherless, 67.					

a Permanent total disability: Loss of both legs or arms, one leg and one arm, total loss of eyesight, paralysis, or other condition permanently incapacitating workman from doing any work of a gainful occupation.

b Permanent partial disability: Loss of one foot, leg, hand, eye, one or more fingers, one or more toes, any dislocation where ligaments are severed, or any other injury known in surgery to be permanent partial disability.

c Ore-dressing plants include stamp mills, sampling works, slime plants, lixiviation, leaching, cyanide, and flotation mills.

d "Other serious accidents" in ore-dressing plants, smelting plants, and auxiliary works include 72 cases of permanent partial disability which could not be segregated.

e Smelters include blast, reverberatory, and roasting furnaces; converters; casting department; and refineries. (Iron blast furnaces not included.)

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TABLE 8.—***Ore-dressing plants:*** *Fatalities and injuries, by causes and States, 1914 to 1920.*

	Killed.							Injured.						
	1914	1915	1916	1917	1918	1919	1920	1914	1915	1916	1917	1918	1919	1920
ACCIDENTS BY CAUSES.														
1. Haulage system (cars, motors, etc.)	....	3	3	7	4	....	1	79	106	146	135	107	111	127
2. Railway cars and locomotives	3	2	4	4	1	2	....	38	17	42	29	68	48	24
3. Crushers, rolls, or stamps	2	5	....	3	....	1	2	64	129	168	112	111	108	102
4. Tables, jigs, etc.	....	....	....	2	....	1	....	46	59	82	61	92	59	42
5. Other machinery	6	7	11	9	14	6	8	170	299	336	282	368	284	288
6. Falls of persons	3	6	2	9	6	4	2	205	249	373	399	414	201	323
7. Suffocation in ore bins	2	3	3	3	2	4	4	2	3	4	6	11	5	4
8. Falling objects (rocks, timbers, etc.)	3	....	1	4	....	1	....	222	192	363	371	389	200	283
9. Cyanide or other poisoning	....	....	....	....	1	1	....	9	23	13	24	45	11	16
10. Scalding (steam or water)	....	....	2	1	....	1	....	9	12	35	18	15	34	22
11. Electricity	2	3	2	4	3	2	2	30	38	53	40	63	23	36
12. Hand tools, axes, bars, etc.	....	....	1	....	....	....	....	133	235	360	249	298	167	261
13. Nails, splinters, etc.	....	....	....	....	....	....	....	78	131	171	193	165	97	120
14. Flying pieces of rock from sledging or crushing	....	....	....	....	....	....	....	50	76	109	302	198	140	179
15. Other causes	2	1	4	1	4	2	2	299	526	929	731	798	569	797
Total	**23**	**30**	**33**	**47**	**35**	**25**	**21**	**1,434**	**2,095**	**3,184**	**2,952**	**3,142**	**2,057**	**2,624**
ACCIDENTS BY STATES.														
Alabama	....	1	....	1	....	1	1	1	6	9	7	25	12	9
Alaska	1	....	....	3	....	3	1	30	73	127	141	54	25	49
Arizona	5	1	3	6	6	2	1	287	350	524	578	653	448	314
Arkansas	....	....	....	....	1	....	....	.....	2	20	11	6	.....	29
California	1	2	....	....	3	1	3	111	91	118	30	105	43	114
Colorado	2	7	4	7	2	2	3	103	153	176	214	170	64	120
Idaho	1	1	....	....	....	....	1	19	55	75	62	62	27	51
Illinois	....	....	....	....	....	....	1	3	3	4	9	26	24	16
Kansas	....	....	....	....	....	....	....	.....	2	7	15	31	22	42
Michigan	1	....	2	2	2	2	1	51	112	137	88	88	102	144
Minnesota	....	....	....	....	....	1	....	.....	22	48	40	18	34	19
Missouri	2	2	1	2	1	....	2	180	155	186	175	249	152	130
Montana	4	5	3	6	4	....	1	121	292	168	148	168	82	104
Nevada	2	4	1	4	6	4	2	83	147	133	117	142	51	181
New Jersey	....	1	3	2	....	1	....	27	26	45	57	60	40	26
New Mexico	....	2	4	1	1	1	2	95	131	310	183	229	115	79
New York	....	1	4	1	2	3	....	12	38	73	77	56	206	158
Oklahoma	....	....	....	2	1	3	....	35	3	15	208	212	213	335
Oregon	....	....	....	....	1	....	....	5	11	2	6	2	7	22
Pennsylvania	....	....	....	....	....	....	....	.....	.....	1	1	1	2	24
South Dakota	....	....	....	....	....	....	....	10	33	51	23	32	17	20
Tennessee	....	....	1	1	1	....	....	1	27	48	40	17	26	40
Texas	....	....	....	....	....	....	....	7	.....	7	6	2	.....	.....
Utah	4	2	5	5	2	1	1	211	263	711	496	525	205	276
Vermont	....	....	....	....	....	....	....	.....	3	8	13	22	1	15
Virginia	....	1	1	....	1	....	....	5	35	43	16	30	38	16
Washington	....	....	....	....	....	....	....	.....	.....	.....	8	26	2	5
Wisconsin	....	....	....	3	1	....	....	16	51	90	150	55	40	54
Other States	....	....	1	1	....	....	1	21	11	48	33	76	59	232
Total	**23**	**30**	**33**	**47**	**35**	**25**	**21**	**1,434**	**2,095**	**3,184**	**2,952**	**3,142**	**2,057**	**2,624**

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TABLE 9.—***Smelting plants:*** *Fatalities and injuries, by causes and States, 1914 to 1920.*

	Killed.							Injured.						
	1914	1915	1916	1917	1918	1919	1920	1914	1915	1916	1917	1918	1919	1920
ACCIDENTS BY CAUSES.														
16. Haulage system (cars, motors, etc.)	3	10	4	7	8	6	4	495	529	814	693	559	350	238
17. Railway cars and locomotives	7	2	2	4	5	....	....	111	61	117	113	87	46	72
18. Cranes	....	2	5	3	2	6	....	55	58	130	146	97	60	51
19. Other machinery	3	5	3	9	13	4	5	250	290	385	375	377	217	185
20. Falls of persons	6	3	9	8	4	4	3	620	499	757	564	496	330	295
21. Suffocation in ore bins	2	1	1	1	....	1	....	1	8	1	73	5	2	4
22. Flying or falling objects (rocks, timbers, etc.)	1	1	4	2	....	2	3	1,052	914	1,438	1,107	1,050	734	609
23. Gas (burns or asphyxiation)	....	3	1	....	....	1	....	59	68	112	48	136	60	40
24. Scalding (steam or water)	1	2	1	2	....	....	1	62	46	132	76	68	39	47
25. Electricity	2	4	1	9	3	2	1	49	46	36	37	41	31	23
26. Hand tools, axes, bars, etc	....	....	....	....	....	....	....	586	633	875	736	562	337	414
27. Nails, splinters, etc	....	....	....	....	....	....	....	96	146	252	208	163	70	87
28. Burns from matte, slag, or molten metal (pouring or spilling)	2	3	1	2	4	2	....	959	894	2,163	1,488	1,290	959	897
29. Hot-metal explosions	....	1	3	2	2	2	1	162	160	217	242	255	95	62
30. Other causes	6	1	1	4	1	4	2	1,116	1,366	2,227	1,839	1,557	1,101	1,123
Total	**33**	**38**	**36**	**53**	**42**	**34**	**20**	**5,673**	**5,718**	**9,656**	**7,745**	**6,743**	**4,431**	**4,147**
ACCIDENTS BY STATES.														
Arizona	3	7	1	10	9	5	3	553	574	1,112	1,184	1,412	716	687
Arkansas	....	....	....	....	2	....	1	....	....	154	83	53	65	84
California	1	....	1	5	....	1	....	163	163	224	188	289	122	37
Colorado	2	6	1	1	5	1	2	636	404	508	331	269	172	165
Illinois	3	2	2	3	3	....	3	697	782	1,356	749	636	408	433
Kansas	....	1	3	1	2	1	....	89	408	695	283	125	157	141
Maryland	....	....	1	2	1	....	....	....	....	605	359	131	....	....
Michigan	....	....	1	....	....	1	....	....	....	251	164	104	52	107
Missouri	....	3	2	2	....	....	....	257	304	317	437	482	271	427
Montana	6	6	3	....	2	7	2	538	457	333	238	248	141	151
Nevada	1	....	....	3	2	1	....	33	58	90	132	117	28	132
New Jersey	3	4	6	5	4	4	....	622	630	646	677	682	414	377
New Mexico	....	....	....	....	....	....	....	....	....	....	10	....	....	....
New York	1	....	1	....	....	....	....	49	....	361	....	....	4	....
Oklahoma	1	1	1	4	4	....	....	97	262	817	895	479	544	265
Oregon	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Pennsylvania	1	2	3	3	2	....	....	205	339	610	608	396	382	374
South Dakota	....	....	....	....	....	....	....	....	....	1	....	....	....	....
Tennessee	1	1	1	....	....	1	....	326	249	241	....	....	130	....
Texas	....	....	....	....	1	....	....	....	....	179	164	178	99	39
Utah	5	3	8	9	4	4	3	605	437	622	556	383	265	163
Vermont	....	....	....	....	....	....	....	....	....	2	....	....	....	....
Virginia	....	....	....	....	....	....	....	....	....	39	....	....	2	....
Washington	....	....	1	....	....	1	....	....	....	135	....	....	71	77
West Virginia	....	1	....	1	....	....	....	61	106	148	182	107	83	91
Wisconsin	....	....	....	....	....	....	....	....	....	1	36	....	15	26
Other States	5	1	....	4	1	7	6	742	545	209	469	652	290	371
Total	**33**	**38**	**36**	**53**	**42**	**34**	**20**	**5,673**	**5,718**	**9,656**	**7,745**	**6,743**	**4,431**	**4,147**

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TABLE 10.—***Metallurgical plants:*** *Injuries and number injured per 1,000 300-day workers employed, by causes, 1914 to 1920.*

Cause of accident.	Number injured.							Number injured per 1,000 300-day workers.						
	1914	1915	1916	1917	1918	1919	1920	1914	1915	1916	1917	1918	1919	1920
Ore-dressing plants:														
1. Haulage system (cars, motors, etc.)	79	106	146	135	107	111	127	5.19	5.55	6.22	5.54	4.75	6.60	7.95
2. Railway cars and locomotives	38	17	42	29	68	48	24	2.50	.89	1.79	1.19	3.02	2.85	1.50
3. Crushers, rolls, or stamps	64	129	168	112	111	108	102	4.20	6.75	7.16	4.60	4.93	6.42	6.38
4. Tables, jigs, etc	46	59	82	61	92	59	42	3.02	3.09	3.49	2.50	4.08	3.51	2.63
5. Other machinery	170	299	336	282	368	284	288	11.17	15.65	14.32	11.57	16.34	16.87	18.03
6. Falls of persons	205	249	373	399	414	201	323	13.47	13.03	15.89	16.37	18.39	11.94	20.22
7. Suffocation in ore bins	2	3	4	6	11	5	4	.13	.16	.17	.25	.49	.30	.25
8. Falling objects (rocks, timbers, etc.)	222	192	363	371	389	200	283	14.58	10.05	15.47	15.22	17.28	11.87	17.71
9. Cyanide or other poisoning	9	23	13	24	45	11	16	.59	1.20	.55	.98	2.00	.65	1.00
10. Scalding (steam or water)	9	12	35	18	15	34	22	.59	.63	1.49	.74	.67	2.02	1.38
11. Electricity	30	38	53	40	63	23	36	1.97	1.99	2.26	1.64	2.80	1.37	2.25
12. Hand tools, axes, bars, etc	133	235	360	249	298	167	261	8.74	12.30	15.34	10.22	13.23	9.92	16.34
13. Nails, splinters, etc	78	131	171	193	165	97	120	5.12	6.85	7.29	7.92	7.33	5.76	7.51
14. Flying pieces of rock from sledging or crushing	50	76	109	302	198	140	179	3.28	3.98	4.64	12.39	8.79	8.32	11.20
15. Other causes	299	526	929	731	798	569	797	19.64	27.53	39.58	29.99	35.44	33.81	49.89
Total	**1,434**	**2,095**	**3,184**	**2,952**	**3,142**	**2,057**	**2,624**	**94.19**	**109.65**	**135.66**	**121.12**	**139.54**	**122.21**	**164.24**
Number of 300-day workers	**15,225**	**19,107**	**23,470**	**24,372**	**22,517**	**16,832**	**15,977**							
Smelting plants:														
16. Haulage system (cars, motors, etc.)	495	529	814	693	559	350	238	15.31	14.59	16.49	13.68	12.30	11.17	8.17
17. Railway cars and locomotives	111	61	117	113	87	46	72	3.43	1.68	2.37	2.23	1.91	1.47	2.47
18. Cranes	55	58	130	146	97	60	51	1.70	1.60	2.63	2.88	2.13	1.92	1.75
19. Other machinery	250	290	385	375	377	217	185	7.73	8.00	7.80	7.40	8.30	6.93	6.35
20. Falls of persons	620	499	757	564	496	330	295	19.17	13.76	15.34	11.13	10.92	10.54	10.12
21. Suffocation in ore bins	1	8	1	73	5	2	4	.03	.22	.02	1.44	.11	.06	.14
22. Flying or falling objects (rocks, timbers, etc.)	1,052	914	1,438	1,107	1,050	734	609	32.53	25.21	29.13	21.85	23.11	23.43	20.90
23. Gas (burns or asphyxiation)	59	68	112	48	136	60	40	1.83	1.87	2.27	.95	2.99	1.92	1.37
24. Scalding (steam or water)	62	46	132	76	68	39	47	1.92	1.27	2.67	1.50	1.50	1.25	1.61
25. Electricity	49	46	36	37	41	31	23	1.52	1.27	.73	.73	.90	.99	.79
26. Hand tools, axes, bars, etc	586	633	875	736	562	337	414	18.12	17.46	17.73	14.53	12.37	10.76	14.21
27. Nails, splinters, etc	96	146	252	208	163	70	87	2.97	4.03	5.10	4.11	3.59	2.23	2.99
28. Burns from matte, slag, or molten metal (pouring or spilling)	959	894	2,163	1,488	1,290	959	897	29.66	24.65	43.82	29.37	28.39	30.61	30.79
29. Hot-metal explosions	162	160	217	242	255	95	62	5.01	4.41	4.40	4.78	5.61	3.03	2.13
30. Other causes	1,116	1,366	2,227	1,839	1,557	1,101	1,123	34.51	37.67	45.11	36.30	34.27	35.15	38.54
Total	**5,673**	**5,718**	**9,656**	**7,745**	**6,743**	**4,431**	**4,147**	**175.44**	**157.69**	**195.61**	**152.88**	**148.40**	**141.46**	**142.33**
Number of 300-day workers	**32,336**	**36,262**	**49,363**	**50,659**	**45,439**	**31,324**	**29,137**							

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TABLE 11.—***Metallurgical plants:*** *Men employed and the equivalent in 300-day workers, by States, 1914 to 1920.*

ACTUAL NUMBER EMPLOYED.

State.	Ore-dressing plants.							Smelting plants.						
	1914	1915	1916	1917	1918	1919	1920	1914	1915	1916	1917	1918	1919	1920
Alabama	100	57	92	193	315	203	194	.....	.....	.....	.....	.....	.....	.....
Alaska	225	520	925	467	336	375	459	.....	.....	.....	.....	.....	.....	.....
Arizona	1,314	1,776	2,380	2,630	3,319	2,149	1,812	2,491	2,813	3,470	4,398	4,477	1,678	2,593
Arkansas	(a)	89	173	163	74	29	143	.....	.....	410	530	465	712	440
California	581	766	794	755	1,229	633	508	917	1,050	1,146	590	639	464	333
Colorado	960	1,219	1,382	1,715	1,885	1,347	1,027	2,810	2,327	3,099	2,864	2,671	1,438	1,371
Georgia	(a)	57	68	82	(a)	21	(a)	.....	.....	.....	.....	.....	.....	(a)
Idaho	441	470	611	342	452	494	512	.....	.....	.....	(a)	(a)	(a)	(a)
Illinois	164	(a)	58	156	151	120	121	3,228	3,467	4,735	3,731	3,711	2,582	2,433
Kansas	(a)	114	80	206	147	194	209	942	2,584	3,611	2,148	848	791	852
Maryland	.....	(a)	9	26	.....	(a)	(a)	.....	.....	1,300	3,414	2,628	(a)	(a)
Michigan	1,761	2,354	2,255	2,426	1,948	1,795	1,418	(a)	724	1,001	1,197	994	764	585
Minnesota	(a)	241	286	337	561	522	556	.....	.....	.....	.....	.....	.....	.....
Missouri	1,466	1,462	1,375	1,523	1,074	878	795	980	1,155	1,532	1,560	1,226	1,000	1,053
Montana	1,709	2 451	2 153	2,051	2,360	1,096	1,122	2,508	3,344	3,200	2,399	2,452	1,350	1,214
Nevada	1,396	1,401	1,556	1,565	1,450	903	889	726	722	870	1,143	1,297	836	672
New Jersey	440	562	715	537	671	605	511	3,567	4,116	4,870	4,313	4,133	3,002	2,650
New Mexico	741	762	1,346	891	773	587	558	.....	(a)	48	152	(a)	(a)	(a)
New York	145	370	567	565	435	793	911	210	.....	570	(a)	(a)	233	(a)
North Carolina	(a)	94	55	46	46	43	(a)	.....	.....	.....	.....	.....	.....	(a)
Oklahoma	404	113	94	452	471	1,071	166	1,210	1,679	5,181	5,063	3,064	2,161	704
Oregon	142	69	77	97	67	95	48	.....	(a)	22	(a)	(a)	(a)	.....
Pennsylvania	.....	(a)	25	24	56	52	90	1,279	2,015	2,588	3,700	3,803	3,138	2,955
South Dakota	358	395	362	250	304	288	248	.....	.....	16	.....	.....	.....	.....
Tennessee	87	328	460	425	266	206	366	299	(a)	200	(a)	(a)	204	(a)
Texas	57	.....	60	100	72	(a)	(a)	(a)	919	963	1,100	1,116	492	674
Utah	2,054	1,664	3,017	4,103	1,942	1,382	1,064	2,779	2,198	2,401	2,658	3,173	1,832	1,775
Vermont	.....	131	137	215	193	66	134	.....	.....	8	.....	.....	.....	.....
Virginia	100	488	475	709	550	648	599	(a)	(a)	251	(a)	(a)	231	(a)
Washington	18	(a)	17	63	147	79	177	(a)	865	1,045	(a)	(a)	1,449	776
West Virginia	.....	.....	.....	.....	.....	.....	.....	826	834	932	1,090	712	610	640
Wisconsin	175	254	421	247	195	219	166	(a)	(a)	5	113	(a)	85	151
Other States	290	357	340	450	320	369	1,156	3,107	515	360	2,213	2,490	3,725	3,073
Total	**15,128**	**18,564**	**22,365**	**24,111**	**21,809**	**17,262**	**15,959**	**27,879**	**31,327**	**43,829**	**44,376**	**39,899**	**28,777**	**24,944**

a Included in "Other States."

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EQUIVALENT IN 300-DAY WORKERS (CALCULATED).

State.	Ore-dressing plants.							Smelting plants.						
	1914	1915	1916	1917	1918	1919	1920	1914	1915	1916	1917	1918	1919	1920
Alabama	58	19	55	149	191	101	127	.....	.....	.....	.....	.....	.....	.....
Alaska	263	530	1,111	467	373	445	557	.....	.....	.....	.....	.....	.....	.....
Arizona	1,457	1,839	2,637	2,679	3,730	2,420	2,083	2,919	3,034	4,034	5,068	5,425	1,869	3,158
Arkansas	.....	75	142	128	57	25	125	.....	.....	251	609	543	813	490
California	512	812	780	906	1,475	518	454	1,047	1,239	1,274	708	766	384	364
Colorado	975	1,219	1,382	1,715	1,885	1,207	1,060	3,356	2,799	3,098	2,864	2,671	1,749	1,517
Georgia	.....	48	65	83	.....	13	(a)	.....	.....	.....	.....	.....	.....	(a)
Idaho	388	438	629	597	451	406	536	.....	.....	.....	.....	.....	(a)	(a)
Illinois	121	.....	36	143	153	111	107	3,892	4,159	5,434	4,398	4,471	2,775	2,939
Kansas	.....	85	79	107	103	169	158	1,126	2,454	4,083	2,077	566	938	1,015
Maryland	.....	.....	5	18	.....	(a)	(a)	.....	.....	1,522	3,726	2,849	(a)	(a)
Michigan	1,646	2,406	2,346	2,510	1,987	1,879	1,428	.....	748	1,089	1,238	1,023	862	589
Minnesota	.....	161	239	269	315	277	292	.....	.....	.....	.....	.....	.....	.....
Missouri	1,339	1,316	1,332	1,307	981	740	841	1,177	1,336	1,806	1,898	1,114	892	1,172
Montana	1,725	2,655	2,152	2,019	2,490	1,197	1,241	2,642	4,002	3,265	2,507	2,550	1,558	1,418
Nevada	1,525	1,541	1,713	1,621	1,739	1,084	997	843	866	1,018	1,378	1,557	1,005	780
New Jersey	451	607	804	551	679	597	511	4,048	4,958	5,929	5,123	5,013	2,746	3,193
New Mexico	786	878	1,547	969	841	617	519	.....	.....	55	76	.....	(a)	.....
New York	104	348	509	522	357	749	886	215	.....	514	.....	.....	208	.....
North Carolina	.....	61	51	38	45	34	.....	.....	.....	.....	.....	.....	.....	.....
Oklahoma	394	88	71	346	385	959	148	1,414	2,043	5,487	6,093	3,315	2,451	644
Oregon	113	56	40	79	70	66	48	.....	.....	25	.....	.....	(a)	.....
Pennsylvania	.....	.....	26	17	43	45	101	1,509	2,205	3,106	4,442	4,609	3,606	3,562
South Dakota	431	461	387	292	321	307	300	.....	.....	8	.....	.....	.....	.....
Tennessee	90	264	401	382	222	165	365	351	.....	234	.....	.....	225	.....
Texas	62	.....	58	98	61	(a)	.....	.....	1,118	1,172	1,336	1,352	583	818
Utah	2,398	2,005	3,579	4,865	2,304	1,613	1,216	3,377	2,674	2,928	3,176	3,861	2,225	2,137
Vermont	.....	123	140	194	191	55	132	.....	.....	2	.....	.....	.....	.....
Virginia	81	511	453	690	518	529	522	.....	.....	290	.....	.....	166	.....
Washington	12	.....	14	39	126	64	115	.....	1,052	1,171	.....	.....	1,598	944
West Virginia	.....	.....	.....	.....	.....	.....	.....	980	1,014	1,130	1,269	845	631	669
Wisconsin	132	268	376	213	196	194	151	.....	.....	5	124	.....	100	182
Other States	172	293	311	359	228	276	957	3,440	561	433	2,549	2,909	3,940	3,546
Total	**15,225**	**19,107**	**23,470**	**24,372**	**22,517**	**16,862**	**15,977**	**32,336**	**36,263**	**49,263**	**50,659**	**45,489**	**31,324**	**29,137**

a Included in "Other States."

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TABLE 12.—***Metallurgical plants:*** *Days of labor performed and average number of days plants were operated, by States, 1914 to 1920.*

DAYS OF LABOR PERFORMED.

State.	Ore-dressing plants.							Smelting plants.						
	1914	1915	1916	1917	1918	1919	1920	1914	1915	1916	1917	1918	1919	1920
Alabama	17,250	5,572	16,488	44,715	57,429	30,286	38,216	.....	.....	.....	.....	.....	.....	.....
Alaska	76,046	159,078	333,360	139,960	111,896	133,614	167,076	.....	.....	.....	.....	.....	.....	.....
Arizona	437,061	551,719	790,821	803,567	1,119,017	725,921	624,922	875,543	910,120	1,410,377	1,520,283	1,627,441	560,707	947,232
Arkansas	.....	22,400	42,730	38,343	17,090	7,475	37,350	.....	.....	75,240	182,575	162,975	243,925	147,070
California	153,471	243,708	284,004	271,800	442,391	155,511	136,219	314,162	371,847	382,190	212,400	229,886	115,133	109,314
Colorado	292,491	365,678	414,681	514,500	565,648	362,217	317,982	1,006,670	839,587	929,559	859,200	801,270	524,870	455,156
Georgia	.....	14,540	19,430	24,769	.....	3,883	.....	.....	.....	.....	.....	.....	.....	.....
Idaho	116,527	131,352	188,673	179,238	135,221	121,734	160,659	.....	.....	.....	.....	.....	.....	.....
Illinois	36,325	.....	10,742	43,008	45,840	33,410	32,089	1,167,544	1,247,660	1,630,241	1,319,525	1,341,285	832,610	881,769
Kansas	.....	25,584	23,853	32,190	31,005	50,629	47,438	337,890	736,108	1,224,975	623,042	169,679	281,470	304,551
Maryland	.....	.....	1,395	5,432	.....	.....	.....	.....	.....	456,500	1,117,802	854,689	.....	.....
Michigan	493,875	721,634	703,788	752,874	596,086	563,752	428,298	.....	224,250	326,669	371,479	306,790	258,605	176,680
Minnesota	.....	48,385	71,663	80,703	94,522	83,016	87,637	.....	.....	.....	.....	.....	.....	.....
Missouri	401,615	394,850	399,764	392,225	294,256	221,938	252,183	353,126	400,689	541,880	569,400	334,238	267,727	351,635
Montana	517,458	796,575	645,679	605,705	747,166	359,015	372,350	792,731	1,200,496	979,580	752,157	765,125	467,229	425,459
Nevada	457,581	462,322	514,024	486,255	521,580	325,020	298,950	253,006	259,972	305,372	413,423	467,130	301,590	234,083
New Jersey	135,312	182,230	241,165	165,308	203,831	179,166	153,150	1,214,362	1,487,345	1,778,862	1,536,773	1,503,858	823,662	957,916
New Mexico	235,843	263,494	464,224	290,846	252,373	185,184	155,812	.....	.....	16,464	22,680	.....	.....	.....
New York	31,151	104,382	152,632	156,601	107,088	224,526	265,708	64,500	.....	154,200	.....	.....	62,461	.....
North Carolina	.....	18,265	15,186	11,285	13,436	10,207	.....	.....	.....	.....	.....	.....	.....	.....
Oklahoma	118,217	26,397	21,283	103,933	115,516	287,584	44,438	424,145	612,835	1,646,034	1,827,884	994,487	735,200	193,177
Oregon	33,960	16,879	11,969	23,637	20,854	19,798	14,530	.....	.....	7,568	.....	.....	.....	.....
Pennsylvania	.....	.....	7,830	5,165	12,771	13,425	30,195	452,803	661,376	931,710	1,332,500	1,382,795	1,081,704	1,068,518
South Dakota	129,410	138,182	115,978	87,475	96,189	92,227	90,033	.....	.....	2,359	.....	.....	.....	.....
Tennessee	27,131	79,091	120,370	114,513	66,536	49,565	109,362	105,229	.....	70,200	.....	.....	67,350	.....
Texas	18,465	.....	17,370	29,330	18,375	.....	.....	.....	335,435	351,495	400,962	405,521	174,764	245,398
Utah	719,243	601,358	1,073,745	1,459,383	691,255	483,852	364,689	1,013,095	802,270	878,426	952,918	1,158,145	667,450	640,957
Vermont	.....	36,822	42,074	58,308	57,419	16,420	39,609	.....	.....	400	.....	.....	.....	.....
Virginia	24,330	153,397	136,038	206,921	155,436	158,846	156,637	.....	.....	86,956	.....	.....	49,757	.....
Washington	3,520	.....	4,059	11,800	37,775	19,302	34,424	.....	315,725	351,275	.....	.....	479,405	283,238
West Virginia	.....	.....	.....	.....	.....	.....	.....	294,015	304,368	339,024	380,578	253,608	189,270	200,570
Wisconsin	39,624	80,296	112,854	64,011	58,667	58,116	46,160	.....	.....	1,500	37,225	.....	30,059	54,558
Other States	51,623	87,994	93,211	107,699	68,294	82,906	287,035	1,031,948	168,403	129,990	764,837	872,679	1,182,134	1,063,835
Total	**4,567,529**	**5,732,184**	**7,041,083**	**7,311,499**	**6,754,962**	**5,058,545**	**4,793,151**	**9,700,769**	**10,878,486**	**14,809,046**	**15,197,643**	**13,631,601**	**9,397,082**	**8,741,116**

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TABLE 12.—***Metallurgical plants:*** *Days of labor performed and average number of days plants were operated, by States, 1914 to 1920*—Continued.

AVERAGE DAYS ACTIVE.

State.	Ore-dressing plants.							Smelting plants.						
	1914	1915	1916	1917	1918	1919	1920	1914	1915	1916	1917	1918	1919	1920
Alabama	173	98	179	232	182	149	**197**	.....	.....	.....	.....	.....	.....	.....
Alaska	338	306	360	300	333	356	**364**	.....	.....	.....	.....	.....	.....	.....
Arizona	333	311	332	306	337	338	**345**	351	324	349	346	364	334	**365**
Arkansas	.....	252	247	235	231	258	**261**	.....	.....	184	344	350	343	**334**
California	264	318	295	360	360	246	**268**	343	354	333	360	360	248	**328**
Colorado	305	300	300	300	300	269	**310**	358	361	300	300	300	365	**332**
Georgia	.....	255	286	302	.....	185	.....	.....	.....	.....	.....	.....	.....	.....
Idaho	264	279	309	279	299	246	**314**	.....	.....	.....	.....	.....	.....	.....
Illinois	221	.....	185	276	304	278	**265**	362	360	344	354	361	322	**362**
Kansas	.....	224	298	156	211	261	**227**	359	285	339	290	200	356	**357**
Maryland	.....	.....	155	209	.....	.....	.....	.....	.....	351	327	325	.....	.....
Michigan	280	307	312	310	306	314	**302**	.....	310	326	310	309	338	**302**
Minnesota	.....	201	251	239	168	159	**158**	.....	.....	.....	.....	.....	.....	.....
Missouri	274	270	291	258	274	253	**317**	360	347	354	365	273	268	**334**
Montana	303	325	300	295	317	327	**332**	316	359	306	314	312	346	**350**
Nevada	328	330	330	311	360	360	**336**	348	360	351	362	360	361	**348**
New Jersey	308	324	337	308	304	296	**300**	340	361	365	356	364	274	**361**
New Mexico	318	346	345	326	326	315	**265**	.....	.....	343	149	.....	.....	.....
New York	215	282	269	277	246	283	**292**	307	.....	271	.....	.....	268	.....
North Carolina	.....	194	276	245	292	237	.....	.....	.....	.....	.....	.....	.....	.....
Oklahoma	293	234	226	230	245	269	**268**	351	365	318	361	325	340	**274**
Oregon	239	245	155	244	311	208	**303**	.....	.....	344	.....	.....	.....	.....
Pennsylvania	.....	.....	313	215	228	258	**336**	354	328	361	360	364	345	**362**
South Dakota	361	350	320	350	316	320	**363**	.....	.....	147	.....	.....	.....	.....
Tennessee	312	241	262	269	250	241	**299**	352	.....	351	.....	.....	330	.....
Texas	324	.....	290	293	255	.....	.....	.....	365	365	365	363	355	**364**
Utah	350	361	356	356	356	350	**343**	365	365	365	359	365	364	**361**
Vermont	.....	281	307	271	298	249	**296**	.....	.....	50	.....	.....	.....	.....
Virginia	243	314	286	292	283	245	**261**	.....	.....	346	.....	.....	215	.....
Washington	196	.....	239	187	257	244	**194**	.....	365	336	.....	.....	331	**365**
West Virginia	.....	.....	.....	.....	.....	.....	.....	356	365	364	349	356	310	**313**
Wisconsin	226	316	268	259	301	265	**278**	.....	.....	300	329	.....	354	**361**
Other States	178	247	274	239	213	225	**248**	332	327	361	346	350	317	**346**
Total	**302**	**309**	**315**	**303**	**310**	**293**	**300**	**348**	**347**	**338**	**342**	**342**	**326**	**350**

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TABLE 13.—***Metallurgical plants:*** *Fatalities and number killed per 1,000 300-day workers employed, by causes, 1914 to 1920.*

Cause of accident.	Number killed.							Number killed per 1,000 300-day workers.						
	1914	1915	1916	1917	1918	1919	1920	1914	1915	1916	1917	1918	1919	1920
ORE-DRESSING PLANTS.														
1. Haulage (cars and motors)	.....	3	3	7	4	.....	1	.....	0.16	0.13	0.28	0.18	.....	.06
2. Railway cars or locomotives	3	2	4	4	1	2	.....	0.20	.10	.17	.17	.04	0.12	.....
3. Crushers, rolls, or stamps	2	5	.....	3	.....	1	2	.13	.26	.....	.12	.....	.06	.13
4. Tables, jigs, etc	.....	.....	.....	2	.....	1	.....	.....	.....	.....	.08	.....	.06	.....
5. Other machinery	6	7	11	9	14	6	8	.39	.37	.47	.37	.62	.36	.50
6. Falls of persons	3	6	2	9	6	4	2	.20	.31	.08	.37	.26	.24	.13
7. Suffocation in ore bins	2	3	3	3	2	4	4	.13	.16	.13	.12	.09	.24	.25
8. Falling objects (rocks, timbers, etc.)	3	.....	1	4	.....	1	.....	.20	.....	.04	.17	.....	.06	.....
9. Cyanide or other poisoning	.....	.....	.....	.....	1	1	.....	.....	.....	.....	.....	.04	.06	.....
10. Scalding (steam or water)	.....	.....	2	1	.....	1	.....	.....	.....	.09	.04	.....	.06	.....
11. Electricity	2	3	2	4	3	2	2	.13	.16	.09	.17	.15	.12	.13
12. Hand tools, axes, bars, etc	.....	.....	1	.....	.....	.....	.....	.....	.....	.04	.....	.....	.....	.....
13. Nails, splinters, etc	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
14. Flying pieces of rock from sledging or crushing	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
15. Other causes	2	1	4	1	4	2	2	.13	.05	.17	.04	.17	.12	.13
Total	**23**	**30**	**33**	**47**	**35**	**25**	**21**	**1.51**	**1.57**	**1.41**	**1.93**	**1.55**	**1.50**	**1.31**
SMELTING PLANTS.														
Number killed or injured by—														
16. Haulage (cars, motors, etc.)	3	10	4	7	8	6	4	.09	.27	.08	.14	.18	.20	.14
17. Railway cars or locomotives	7	2	2	4	5	.....	.....	.22	.06	.04	.08	.11	.....	.....
18. Cranes	.....	2	5	3	2	6	.....	.....	.06	.10	.06	.04	.20	.....
19. Other machinery	3	5	3	9	13	4	5	.09	.13	.06	.18	.29	.13	.17
20. Falls of persons	6	3	9	8	4	4	3	.19	.08	.18	.15	.09	.13	.10
21. Suffocation in ore bins	2	1	1	1	.....	1	.....	.06	.03	.02	.02	.....	.03	.....
22. Flying or falling objects (rocks, timbers, etc.)	1	1	4	2	.....	2	3	.03	.03	.08	.04	.....	.06	.10
23. Gas (burns or asphyxiation)	.....	3	1	.....	.....	1	.....	.....	.08	.02	.....	.....	.03	.....
24. Scalding (steam or water)	1	2	1	2	.....	.....	1	.03	.06	.02	.04	.....	.....	.04
25. Electricity	2	4	1	9	3	2	1	.06	.11	.02	.18	.06	.06	.04
26. Hand tools, axes, bars, etc	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
27. Nails, splinters, etc	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
28. Burns from matte, slag, or molten metal (pouring or spilling)	2	3	1	2	4	2	.....	.06	.08	.02	.04	.09	.06	.....
29. Hot-metal explosions	.....	1	3	2	2	2	1	.....	.03	.06	.04	.04	.06	.04
30. Other causes	6	1	1	4	1	4	2	.19	.03	.02	.08	.02	.13	.07
Total	**33**	**38**	**36**	**53**	**42**	**34**	**20**	**1.02**	**1.05**	**.73**	**1.05**	**.92**	**1.08**	**.69**

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TABLE 14.—***Metallurgical plants:*** *Percentage of fatalities and injuries, by causes, 1914 to 1920.*

Cause of accident.	Killed.							Injured.						
	1914	1915	1916	1917	1918	1919	1920	1914	1915	1916	1917	1918	1919	1920
Ore-dressing plants:														
1. Haulage (cars and motors)	.....	10.00	9.09	14.89	11.43	.....	4.76	5.51	5.06	4.59	4.57	3.41	5.40	4.84
2. Railway care or locomotives	13.04	6.67	12.12	8.51	2.86	8.00	.....	2.65	.81	1.32	.98	2.17	2.33	.91
3. Crushers, rolls or stamps	8.70	16.67	.....	6.38	.....	4.00	9.52	4.46	6.16	5.28	3.80	3.53	5.25	3.89
4. Tables, jigs, etc	.....	.....	.....	4.26	.....	4.00	.....	3.21	2.82	2.57	2.07	2.93	2.87	1.60
5. Other machinery	26.08	23.33	33.34	19.15	40.00	24.00	38.10	11.85	14.27	10.55	9.55	11.71	13.81	10.98
6. Falls of persons	13.04	20.00	6.06	19.15	17.14	16.00	9.52	14.30	11.89	11.71	13.52	13.18	9.77	12.31
7. Suffocation in ore bins	8.70	10.00	9.09	6.38	5.71	16.00	19.05	.14	.14	.13	.20	.36	.24	.15
8. Falling objects (rocks, timbers, etc.)	13.04	.....	3.03	8.51	.....	4.00	.....	15.48	9.16	11.40	12.57	12.38	9.72	10.79
9. Cyanide or other poisoning	.....	.....	.....	.....	2.86	4.00	.....	.63	1.10	.41	.81	1.43	.53	.61
10. Scalding (steam or water)	.....	.....	6.06	2.13	.....	4.00	.....	.63	.57	1.10	.61	.45	1.65	.84
11. Electricity	8.70	10.00	6.06	8.51	8.57	8.00	9.52	2.09	1.81	1.66	1.36	2.01	1.12	1.37
12. Hand tools, axes, bars, etc	.....	.....	3.03	.....	.....	.....	.....	9.27	11.22	11.31	8.43	9.49	8.12	9.95
13. Nails, splinters, etc	.....	.....	.....	.....	.....	.....	.....	5.44	6.25	5.37	6.54	5.25	4.72	4.57
14. Flying pieces of rock from sledging or crushing	.....	.....	.....	.....	.....	.....	.....	3.49	3.63	3.42	10.23	6.30	6.81	6.82
15. Other causes	8.70	3.33	12.12	2.13	11.43	8.00	9.52	20.85	25.11	29.18	24.76	25.40	27.66	30.37
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Smelting plants:														
Number killed or injured by—														
16. Haulage (cars, motors, etc.)	9.09	26.31	11.11	13.21	19.05	17.65	20.00	8.73	9.25	8.43	8.95	8.29	7.90	5.74
17. Railway cars or locomotives	21.22	5.26	5.55	7.55	11.91	.....	.....	1.96	1.07	1.21	1.46	1.29	1.04	1.74
18. Cranes	.....	5.26	13.89	5.66	4.76	17.65	.....	.97	1.01	1.35	1.89	1.44	1.35	1.23
19. Other machinery	9.09	13.16	8.33	16.98	30.96	11.77	25.00	4.41	5.07	3.99	4.84	5.59	4.90	4.46
20. Falls of persons	18.18	7.90	25.00	15.10	9.52	11.77	15.00	10.93	8.73	7.84	7.28	7.36	7.45	7.11
21. Suffocation in ore bins	6.06	2.63	2.78	1.89	.....	2.94	.....	.02	.14	.01	.94	.07	.04	.10
22. Flying of falling objects (rocks, timbers, etc.)	3.03	2.63	11.11	3.77	.....	5.88	15.00	18.54	15.99	14.89	14.29	15.57	16.57	14.69
23. Gas (burns or asphyxiation)	.....	7.90	2.78	.....	.....	2.94	.....	1.04	1.19	1.16	.62	2.02	1.35	.96
24. Scalding (steam or water)	3.03	5.26	2.78	3.77	.....	.....	5.00	1.09	.80	1.37	.98	1.01	.88	1.13
25. Electricity	6.06	10.53	2.78	16.98	7.14	5.88	5.00	.86	.80	.37	.48	.61	.70	.55
26. Hand tools, axes, bars, etc	.....	.....	.....	.....	.....	.....	.....	10.33	11.07	9.06	9.50	8.33	7.61	9.98
27. Nails, splinters, etc	.....	.....	.....	.....	.....	.....	.....	1.69	2.55	2.61	2.69	2.42	1.58	2.10
28. Burns from matte, slag, or molten metal (pouring or spilling)	6.06	7.90	2.78	3.77	9.52	5.88	.....	16.90	15.64	22.40	19.21	19.13	21.64	21.63
29. Hot-metal explosions	.....	2.63	8.33	3.77	4.76	5.88	5.00	2.86	2.80	2.25	3.12	3.78	2.14	1.50
30. Other causes	18.18	2.63	2.78	7.55	2.38	11.77	10.00	19.67	23.89	23.06	23.75	23.09	24.85	27.08
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

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TABLE 15.—***Copper metallurgical plants:*** *Summary of labor and accidents at* ***selected*** *plants, 1918 to 1920.*

	1918		1919		1920	
	Mills.	Smelters.	Mills.	Smelters.	Mills.	Smelters.
Number of plants	44	25	23	21	29	24
Men employed	8,222	12,363	4,711	9,294	5,218	8,388
Number of 300-day workers	9,037	14,038	5,452	9,675	5,957	8,816
Total days' labor (shifts)	2,711,186	4,211,381	1,635,520	2,902,514	1,787,219	2,644,834
Average days active	330	341	347	312	343	315
Number killed	13	13	8	17	2	5
Number injured	1,521	2,227	691	1,471	885	1,481
Number killed per 1,000, 300-day workers	1.44	.93	1.47	1.76	.34	.57
Number injured per 1,000, 300-day workers	168.31	158.64	126.74	152.04	148.56	167.99

TABLE 16.—***Copper metallurgical plants:*** *Accidents, by causes, at* ***selected*** *plants, 1918 to 1920.*

Cause of accident.	1918				1919				1920			
	Mills.		Smelters.		Mills.		Smelters.		Mills.		Smelters.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
Haulage system (cars, motors, etc.)	2	41	2	147	....	27	4	115	1	43	1	121
Railway cars and locomotives	....	32	....	43	....	11	....	39	....	7	....	43
Crushers, rolls, or stamps	....	26	....	.....	....	22	....	.....	....	22	....	.....
Tables, jigs, etc	....	44	....	.....	1	18	....	.....	....	16	....	.....
Cranes	....	.....	1	43	....	....	3	45	....	....	....	30
Other machinery	7	161	3	114	2	84	1	82	1	90	....	75
Falls of persons	1	230	1	178	1	88	....	152	....	125	2	132
Suffocation in ore bins	....	7	....	4	2	....	1	1	....	3	....	4
Falling objects (rocks, timbers, etc.)	....	208	....	402	....	67	1	263	....	85	....	258
Cyanide or other poisoning	....	31	....	.....	....	2	....	.....	....	....	....	.....
Gas (burns or asphyxiation)	....	.....	....	11	....	....	1	14	....	....	....	4
Scalding (steam or water)	....	6	....	15	1	9	....	18	....	10	....	15
Electricity	....	42	1	22	....	6	1	18	....	17	....	13
Hand tools, axes, bars, etc	....	175	....	237	....	67	....	120	....	103	....	151
Nails, splinters, etc	....	97	....	66	....	44	....	26	....	40	....	27
Flying pieces of rock from sledging or crushing	....	42	....	.....	....	21	....	.....	....	27	....	.....
Burns from matte, slag, or molten metal	....	.....	3	328	....	....	....	235	....	....	....	259
Hot-metal explosions	....	.....	2	66	....	....	2	44	....	....	1	20
Other causes	3	379	....	551	1	225	3	299	....	297	1	329
Total	13	1,521	13	2,227	8	691	17	1,471	2	885	5	1,481

ACCIDENT RATES FOR MINERAL INDUSTRIES.

Table 17 has been prepared to show the comparative accident rates for 1920 for all branches of the mineral industry for which statistics are compiled by the Bureau of Mines. The highest fatality rate was that for gold, silver, and miscellaneous metal mines, a group that includes all metal mines except those producing copper and iron and those in the Mississippi Valley that produce lead and zinc. The lowest fatality rate was that for sandstone and bluestone quarries, a group that employs a relatively small number of men and in which all work is done by daylight, free from many dangers that are inherent in underground mining.

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No reports of nonfatal accidents at coal mines are received by the Bureau of Mines, but for all other branches of the mineral industry the highest injury rate was that for the lead and zinc mines of the Mississippi Valley, while the lowest was that for marble quarries.

Table 18 and 19 present a 10-year review of the fatality and injury rates for each branch of the mineral industry. The rates are based upon 1,000 employees during a standard year of 300 working days.

TABLE 17.—*Fatality rates in different branches of mineral industries in 1920, compared on a 300-day basis (length of shift not considered).*

Branch of mineral industry.	Average days active.	Men employed.		Days of labor performed.	Killed.	Injured.	Number killed or injured per 1,000 300-day workers.	
		Actual number.	Equivalent in 300-day workers (calculated).				Killed.	Injured.
Coal mines[a]	.....	.....	.....	.....	2,271	(b)	.....	.....
All metal mines	296	136,583	134,540	40,361,893	425	32,562	3.16	242.02
Copper mines	317	35,254	37,274	11,182,119	128	12,047	3.43	323.20
Gold and miscellaneous metal mines	279	29,933	27,849	8,354,830	117	5,704	4.20	204.82
Iron mines	295	45,990	45,249	13,574,788	106	9,072	2.34	200.49
Lead and zinc mines (Mississippi Valley)	283	11,638	10,998	3,299,278	36	3,607	3.27	327.97
Nonmetallic mineral mines	287	13,768	13,170	3,950,878	38	2,132	2.89	161.88
All quarries (including outside works)	267	86,488	77,089	23,126,648	178	11,217	2.31	145.51
Cement-rock quarries	309	13,251	14,165	3,017,582	39	2,585	2.75	182.49
Granite quarries	251	12,735	10,664	3,199,073	22	1,392	2.06	130.53
Limestone quarries	259	43,151	37,182	11,154,653	96	5,321	2.58	143.11
Marble quarries	277	4,438	4,349	851,907	4	400	.92	91.98
Sandstone and bluestone quarries	238	4,466	3,540	1,062,161	2	356	.56	100.56
Slate quarries	295	3,496	3,364	243,915	5	364	1.49	108.20
Trap-rock quarries	231	4,951	3,825	370,218	10	799	2.61	208.89
All quarries (excluding outside works)	255	53,642	45,617	13,685,149	128	6,369	2.81	139.62
All quarries (outside works only)	287	32,846	31,472	9,441,499	50	4,848	1.59	154.01
Metallurgical plants:								
Ore-dressing plants	300	15,959	15,977	4,793,151	21	2,624	1.31	164.24
Smelters	350	24,944	29,137	8,741,116	20	4,147	.69	142.33
Auxiliary works	337	16,005	18,005	5,401,641	20	2,092	1.11	116.19
All coke ovens	319	28,139	29,921	8,976,214	49	3,415	1.64	114.13
Beehive coke ovens	276	10,955	10,094	3,028,062	11	1,035	1.09	102.54
By-product coke ovens	346	17,184	19,827	5,948,152	38	2,380	1.92	120.04
Total, 1920[a]	.....	.....	.....	.....	2,984	.....	.....	.....
Total, 1919	230	1,086,264	831,851	249,978,614	3,023	(b)	3.63	.....

[a] Not available except for number of fatalities. [b] Injuries for coal mines not available.

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TABLE 18.—*United States: Number of men killed per 1,000 300-day workers employed in mineral industries.*

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920
Coal mines	4.97	4.46	4.70	4.66	4.44	3.93	4.25	3.94	4.27	(a)
All metal mines	4.45	4.09	3.72	3.92	3.89	3.62	4.44	3.57	3.47	3.16
Copper mines	5.18	4.53	4.08	3.85	3.72	3.64	5.88	3.45	3.54	3.43
Gold and miscellaneous metal mines	4.28	4.32	3.83	4.06	4.79	4.05	4.03	4.27	4.41	4.20
Iron mines	4.64	3.96	3.29	3.78	2.88	3.41	3.54	3.45	3.09	2.34
Lead and zinc mines (Mississippi Valley)	4.03	4.28	3.90	4.32	5.37	3.14	4.09	3.58	4.13	3.27
Nonmetallic mineral mines	2.01	1.66	3.02	3.72	2.43	3.00	2.48	1.67	1.65	2.89
All quarries (including outside works)	2.23	2.27	2.10	2.64	1.80	2.26	1.83	2.11	1.93	2.31
Cement-rock quarries	3.96	3.48	2.99	3.95	1.60	2.38	2.99	2.14	2.66	2.75
Granite quarries	1.92	1.87	1.47	3.36	2.27	1.86	1.54	2.10	1.81	2.06
Limestone quarries	2.21	2.19	2.13	2.38	1.70	2.36	1.79	1.79	1.97	2.58
Marble quarries	.71	2.48	1.81	2.72	1.00	1.16	.57	2.14	.51	.92
Sandstone and bluestone quarries	1.82	1.16	1.32	1.45	.93	1.28	.99	2.38	.76	.56
Slate quarries	2.60	2.62	3.05	2.99	2.02	2.62	1.31	3.16	1.78	1.49
Trap-rock quarries	1.77	3.08	2.40	2.49	3.46	4.45	2.61	4.47	2.56	2.61
All quarries (excluding outside works)	.....	.....	.....	.....	2.17	2.32	2.00	2.19	2.29	2.81
All quarries (outside works only)	.....	.....	.....	.....	1.05	2.15	1.53	1.98	1.34	1.59
Metallurgical plants:										
Ore-dressing plants	.....	.....	.99	1.51	1.57	1.41	1.93	1.55	1.48	1.31
Smelters	.....	.....	1.93	1.02	1.05	.73	1.05	.92	1.09	.69
Auxiliary works	.....	.....	.....	.....	.....	.89	.94	.85	.31	1.11
All coke ovens	.....	.....	1.97	2.12	1.21	1.32	2.14	2.06	1.92	1.64
Beehive coke ovens	.....	.....	.....	.....	.65	1.29	1.30	1.16	.92	1.09
By-products coke ovens	.....	.....	.....	.....	1.75	1.35	3.13	2.84	2.55	1.92

a Not available.

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TABLE 19.—*United States: Number of men injured per 1,000 300-day workers employed in mineral industries.*

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920
Coal mines	170.27	190.11	179.59	211.87	248.56	250.64	240.97	237.09	233.60	242.02
All metal mines	225.25	258.42	230.80	312.19	322.01	319.58	313.35	322.12	309.60	323.20
Copper mines	80.33	93.04	70.37	126.90	201.49	190.79	172.51	185.18	191.29	204.82
Gold and miscellaneous metal mines	252.30	241.81	268.31	224.07	233.51	240.17	227.54	185.45	202.35	200.49
Iron mines	139.40	158.29	133.51	189.01	238.27	263.09	272.99	319.54	292.28	327.97
Lead and zinc mines (Mississippi Valley)	34.03	66.40	84.86	99.75	107.78	144.70	123.58	104.69	139.27	161.88
Nonmetallic mineral mines	63.85	69.82	88.81	114.92	117.30	175.62	185.14	147.07	144.20	145.51
All quarries (including outside works)	136.52	139.59	207.99	226.20	148.25	248.83	277.73	238.65	231.58	182.49
Cement-rock quarries	53.07	44.87	69.60	109.21	96.72	143.99	189.73	109.68	124.70	130.53
Granite quarries	67.99	79.98	89.05	114.23	127.43	176.10	175.52	141.34	134.05	143.11
Limestone quarries	43.39	42.35	68.67	121.31	93.80	125.20	100.20	58.02	75.26	91.98
Marble quarries	34.68	45.26	74.36	69.08	66.56	127.86	118.89	148.04	131.96	100.56
Sandstone and bluestone quarries	17.72	15.01	18.81	28.61	33.08	85.00	112.04	96.29	98.51	108.20
Slate quarries	69.76	68.89	87.77	152.56	232.85	237.84	222.92	205.17	186.47	208.89
Trap-rock quarries					127.57	158.63	162.95	148.29	146.65	139.62
All quarries (excluding outside works)					96.90	206.06	223.81	145.03	140.28	154.04
All quarries (outside works only)										
Metallurgical plants:										
Ore-dressing plants			122.38	94.19	109.65	135.66	121.12	139.54	122.21	164.24
Smelters			174.71	175.44	157.69	195.61	152.88	148.40	141.46	142.33
Auxiliary works						142.10	169.33	139.63	101.29	116.19
All coke ovens			107.73	103.06	90.78	153.49	188.59	219.64	145.66	114.13
Beehive coke ovens					39.84	100.37	94.43	131.11	125.96	102.54
By-product coke ovens					140.00	217.09	300.06	296.06	158.33	120.04

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